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APA Citation

Towards Earlier Identification: Physicians Assistants' Perceptions of their Ability to Identify, Diagnose, and Refer Patients with Autism Spectrum Disorder

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Early detection is imperative for children with autism spectrum disorder (ASD) to achieve optimal functioning. Knowledge of early signs of ASD, as well as open communication, can mitigate delayed diagnosis. This study explored physician assistants' (PA) abilities to diagnosis ASD as well as gathered information on their training. A majority of respondents who see pediatric patients received training on developmental milestones, but far fewer received training to identify red flags for ASD. Few PAs are talking with every patient's caregivers about a variety of behavioral health conditions, not just ASD. Overall, PAs rated their current skills working with patients with ASD lower than their desired level, suggesting a desire to become more adept at meeting their patients' needs. *J Allied Health* 2019; 48(4):287–292.

IN THE 1940S, researcher Leo Kanner of the United States used the term *autism* to describe children with emotional and/or social problems. More recently, autism is referred to as autism spectrum disorder (ASD), which is a developmental condition that can cause significant social, communication, and behavioral challenges. The incidence of autism has steadily been on the rise over the past several decades. The prevalence of autism is estimated to be 1 in 69 children,[1] and boys are 4.5 more likely than girls to be identified with ASD.[2] While ASD affects all races, ethnic, and socioeconomic groups, the incidence appears to be highest in white children.[1,2]

The American Academy of Pediatrics has put forth efforts to convey the importance of monitoring toddlers'

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development in an ongoing manner by both clinicians and caregivers. Early symptoms of ASD are sometimes easily overlooked: children may be called a "late talker" or "late bloomer." It is important for all clinicians involved in patient care to recognize red flags for ASD so that a prompt referral to the appropriate specialist or early intervention can be made. Early intervention for children with ASD is pivotal in facilitating steady improvement of developmental outcomes. While timely access to early intervention is critical, many allied health professionals, including physician assistants (PAs), may not have the knowledge or training to identify the red flags of ASD and/or developmental disabilities.[3]

PAs are positioned to help recognize and refer children with red flags for ASD, yet few studies to date have addressed PAs' current level of skill to be able to recognize the signs of ASD along with assessing their overall knowledge of ASD red flags. To address this question, Self and colleagues[3] solicited PAs, speech language pathologists (SLP), occupational therapists (OT), and physical therapists (PT) in Kansas to determine if they had been adequately prepared during their pre-professional education to recognize the characteristics of ASD and to conduct ASD-specific screenings. The results indicated that SLP and OT respondents received more pre-professional education on the characteristics of individuals with ASD compared to PTs and PAs. Almost all of the PAs in the study indicated that they had not received pre-professional education on ASD. Additionally, whether PAs received pre-professional education on ASD or not, they were unlikely to attend CME conferences or workshops on the characteristics of ASD. This suggests that more education during both pre-professional education and throughout clinical practice would be beneficial for PAs.[3]

It is important not only to recognize the symptoms of ASD, but to utilize available screening tools. Vismara, Colombi, and Rogers[4] concluded that in children younger than 36 months, 1-hour weekly intervention visits with parent assistance led to positive lasting change in children with ASD, suggesting that the earlier the disorder is identified and treated, the more likely that children will have overall higher functioning in the

future. The American Academy of Pediatrics recommends autism-specific screening at 18- and 24-month well-child care visits.[5] One of the first screening instruments developed to identify children at risk for autism was the Checklist for Autism in Toddlers (CHAT).[6] The CHAT was later modified into a parent-report questionnaire, the Modified Checklist for Autism in Toddlers (M-CHAT)[7] before once again being revised and changed to the M-CHAT-Revised/Follow-up (M-CHAT R/F) to decrease the number of false positives.[8] To date, no research has investigated whether PAs are familiar with administering the M-CHAT-R/F.

Health literacy and communication between patients and caregivers have become important in healthcare today. Many clinicians do not feel comfortable discussing any mental conditions with their patients, which leads to a delay in diagnosis and treatment. Discussing mental health conditions, including ASD, is important to close the treatment gap and to ensure that patients get the care they need as soon as possible.[9] To date, there is a lack of research determining if PAs are discussing mental health conditions with their patients. According to the Health Resources and Services Administration (HRSA), there will be a significant shortage of primary care physicians by 2020. PAs, trained in the medical model, are positioned to alleviate some of the projected shortages of primary care practitioner.[10]

This study had three aims. First, to determine if PAs received training to recognize the red flags for ASD, to administer the M-CHAT R/F, and to work with patients with ASD. Second, to determine PAs' current and desired skill levels in recognizing red flags of ASD. Third, to assess whether PAs were discussing ASD with patient caregivers. Each of these aims addressed a gap in the existing literature.

Methods

The present research was approved by the Kean University institutional review board (IRB #17-092718) before the survey was administered. Respondents to another survey that targeted PAs and PA students were asked to participate in a study on ASD. Informed consent was obtained from all individuals included in the study.

Participants and Procedures

Following a survey conducted by the American Academy of PAs that was open to all PAs and PA students, 2,687 respondents were informed that AAPA was partnering with academic researchers to understand PA training and diagnosis of ASD. Of those solicited to participate, 1,960 PAs and PA students agreed to participate in the present research and began the survey, for a response rate of 72.9%. The present work focused on PA survey respondents. PAs in this study were 69.2% female (0.3% preferred not to answer, the remainder were male),

median age was 38 years old, and median experience was 9 years, consistent with the demographics of the PA profession. The PAs covered every medical specialty and setting. While students were included in the collection of these data, this study is one component within a larger program of research, and student data are not discussed in this report.

Participants first provided demographic information through the online survey tool, as well as information about their practice. Then, participants were presented with the main survey instrument which consisted of a series of questions about their knowledge, perceptions, and diagnostic practices related to ASD. The instrument presented questions to participants with yes/no options as well as Likert scales of agreement where appropriate. PAs were also asked whether they discuss ASD with patient caregivers and were asked about training for identifying red flags of ASD. Finally, they were also administered a needs assessment in which they were asked to rate their current and desired knowledge, skills, and abilities related to ASD on a 0 to 5 scale (none to high).

Analysis

Analysis was conducted using SPSS version 23 (IBM-SPSS, Armonk, NY) and consisted of descriptive statistics as well as parametric and nonparametric inferential statistical tests for needs assessment measures. The authors considered it important to analyze and consider current versus desired abilities for the PA population most likely to encounter and treat ASD: PAs who reported currently seeing patients under the age of 18 (pediatric patients).

When analyzing data from the needs assessment in such a large sample, small differences may be statistically significant, though not meaningfully different. In the present study, Cohen's d, the magnitude of the difference between two means divided by the standard deviation (SD) for the data, is reported. Significant differences with larger effect sizes (e.g., $d<0.20$ considered not meaningful, $d=0.20$ considered small, $d=0.50$ considered medium, $d=0.8$ considered large, $d=1.2$ considered very large) are more likely to be meaningful.[11,12] In addition, given the number of planned comparisons made, a threshold of significance of $p<0.001$ was used, rather than $p<0.05$, to adjust for the increased likelihood of Type I error rate due to multiple comparisons.

Likert scales are ordinal rather than interval in nature, so some argue that non-parametric tests are more appropriate, particularly given the assumption of normality that t-tests require.[13,14] Work by de Winter and Dudou[15] found that parametric and nonparametric tests produce similar false-positive rates and have similar power. Nonparametric tests, which are not bound by an assumption of normally distributed and interval data, were also used to compare current and desired skills and abilities in Tables 2 and 3; for every comparison, the

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TABLE 1. Identification of ASD Red Flags by PAs Who See Pediatric Patients

Metric	Total n	Yes, through training in my PA program %	Yes, through training outside my PA program %	No %
Adequately trained to:				
Administer the M-CHAT R/F	964	12.8	19.9	70.0
Provide care to patients with ASD	960	18.5	25.6	59.3
Identify red flags for ASD?	960	37.3	30.9	37.6
Understand pediatric developmental milestones	959	80.9	21.1	9.8
Have you been trained to identify the presence or absence of the following:				
Prosody	957	10.7	10.4	79.9
Joint attention	963	14.5	17.8	70.6
Perseveration	958	21.1	22.2	59.9
Symbolic play	962	26.6	23.8	53.0
Coordination of nonverbal communication	960	28.2	25.1	51.4
Purposeful play	958	30.3	26.8	46.9
Echolalia	960	35.9	24.5	43.4
Imaginary play	961	33.8	29.1	41.3
Hypersensitivity	964	33.9	32.9	38.5
Repetitive movements	958	40.2	32.6	34.1

Respondents were permitted to select "Yes" for training through PA program and outside of PA program. These options are not mutually exclusive.

nonparametric test and parametric t-test produced concordant results, so t-tests are presented in the tables.

Results

Training on ASD-Related Knowledge and Skills

Table 1 displays training that PAs who see pediatric patients received regarding red flags for ASD as well as ASD-related skills; of note, 70.0% did not receive training on administration of the M-CHAT-Modified Checklist for Autism in Toddler (R/F) and 59.5% did not receive training to provide care to patients with ASD. A vast majority (90.2%) received training to understand pediatric developmental milestones, either through their PA program or through training outside of a PA program.

Specifically related to red flags of ASD, 37.6% of PAs who see pediatric patients did not receive training to identify red flags for ASD. As noted in Table 1, fewer than one-half of PAs who see pediatric patients received training in their PA program, outside their PA program, or from both to identify the following specific red flags for ASD: prosody (20.1% received some form of training in a program or outside of their program); 29.4% for joint attention, 40.1% for perseveration, 46% for symbolic play, and 48.6% for coordination of nonverbal communication. One-half to two-thirds of PAs received training to identify purposeful play (53.1%), echolalia (56.6%), imaginary play (58.7%), hypersensitivity (61.5%), and repetitive movements (65.9%).

Needs Assessment

Among PAs who see pediatric patients (Table 2), current knowledge, skills, and abilities for every domain were low to average. The three areas where PAs reported the lowest current skills were in administering the M-CHAT-R/F ($M_{current}$ = 1.38; $M_{desired}$ = 2.89), understanding the DSM-5 criteria for diagnosing ASD ($M_{current}$ = 1.80; $M_{desired}$ = 3.34), and understanding the early signs or red flags of ASD ($M_{current}$ = 2.32; $M_{desired}$ = 3.64). These three skills were also associated with large-sized differences between current and desired skills and abilities. The difference between current and desired knowledge, skills, and abilities for administering M-CHAT-R/F was 1.51 [CI: 1.40, 1.61], $p<0.001$, $d=0.89$. For understanding the DSM-5 criteria for diagnosing ASD, the difference between current and desired knowledge, skills, and abilities was 1.54 [CI: 1.45, 1.63], $p<0.001$, $d=1.08$. Finally, a sizeable difference for understanding the early signs, or red flags, of ASD was reported, with a difference of 1.32 [CI: 1.23, 1.40], $p<0.001$, $d=0.97$.

PAs reported relatively higher current skills and abilities related to making referrals, though these were still low. Understanding where to make referrals for further evaluation ($M_{current}$ = 2.60; $M_{desired}$ = 3.68, $p<0.001$, $d=0.73$), audiologic evaluation ($M_{current}$ = 2.69; $M_{desired}$ = 3.53, $p<0.001$, $d=0.84$), or early intervention ($M_{current}$ = 2.51; $M_{desired}$ = 3.67, $p<0.001$, $d=0.76$) all were associated with medium-sized differences between current and desired knowledge, skills, and abilities.

Conversations with Caregivers and Identifications of Red Flags

Among PAs who see pediatric patients, 40.4% of PAs reported not discussing ASD with caregivers, 56.0% discuss ASD with those for whom there is a concern, and 3.6% discuss ASD with the caregivers of all patients. Across all behavioral health conditions assessed, 20.0%

TABLE 2. Needs Assessment: Knowledge of ASD Among PA Respondents Who See Pediatric Patients

Question	No.	Current Mean (SD)	Desired Mean (SD)	Gap Difference (CI)	Sign.* p	Effect Size d
Understanding all pediatric developmental milestones	873	2.82 (1.21)	3.85 (1.27)	1.03 (0.95, 1.11)	<0.001	0.83
Understanding the early signs, or red flags, of ASD	866	2.32 (1.33)	3.64 (1.38)	1.32 (1.23, 1.40)	<0.001	0.97
Understanding the DSM-5 criteria for diagnosing ASD	877	1.80 (1.37)	3.34 (1.48)	1.54 (1.45, 1.63)	<0.001	1.08
Administering the M-CHAT-R/F	875	1.38 (1.60)	2.89 (1.79)	1.51 (1.40, 1.61)	<0.001	0.89
Understanding where to make a referral for early intervention in the event you needed to refer a child to their services	868	2.51 (1.60)	3.67 (1.44)	1.15 (1.06, 1.25)	<0.001	0.76
Understanding where to make a referral for audiologic evaluation in the event you needed to refer a child to their services	875	2.69 (1.70)	3.53 (1.51)	0.84 (0.74, 0.93)	<0.001	0.52
Understanding where to make a referral for further evaluation in the event you needed to refer a child to their services	866	2.60 (1.55)	3.68 (1.41)	1.09 (1.0, 1.18)	<0.001	0.73

* Results based on paired-samples parametric analysis. Nonparametric tests yielded the same significance.

of PAs who see pediatric patients never talk with caregivers about depression, 20.6% never talk about anxiety, 33.0% never talk about attention deficit/hyperactivity disorder, and 42.7% never talk about conduct disorder or operational defiant disorder, even when there is a concern (Table 3).

Discussion

When screening toddlers for ASD, red flags can be easily overlooked since healthcare providers are seeing a child for a limited time and in isolation. Unfortunately, children with ASD do not present to the office with a typically developing age-matched peer, which may increase the likelihood of noticing differences. On the contrary, in certain situations and contexts, children with ASD may appear quite typical. It is not possible for clinicians to observe their patients in a variety of activities and thus it is imperative for them to solicit as much information as possible from their patients' caregivers.

PA education and training is rigorous and includes an average of 57.3 weeks of didactic education and an additional 53.7 weeks in clinical rotations divided among the subspecialties including at least one rotation dedicated to pediatrics.[16] However, specific education on the red flags for ASD appears to be lacking. While 80.9% of PAs received training within their PA program to identify typical pediatric developmental milestones, only 37.3% received training on how to identify the red flags for ASD. Additionally, 70% stated they did not receive any training on administering the M-CHAT-R/F to their patients, and 59.3% stated the did not received education on providing care to patients with ASD. Understanding the limitations to training is a first step to improving care to patients with ASD along with providing support to their caregivers. Given the number of comorbid conditions related to ASD,[17] as well as treatment compliance issues,[18] the results suggest a significant gap in PA education.

Early identification and intervention are important predictors of long-term outcomes for children with ASD.[19] It is recommended that clinicians discuss developmental and behavioral concerns with caregivers at every well-child visit, to observe for signs of ASD, and to have the conversations with caregivers about the patient that will allow the clinical to develop a full picture of the health and well-being of the patient.[20] Despite evidence supporting the importance of early intervention, few PAs who see pediatric patients are having the conversations with every caregiver or provided training to provide care to patients with ASD. PAs, regardless of whether they work with pediatric patients, do want to become more skilled in these areas, however.

The U.S. Preventive Services Task Force shows that the evidence is mixed in terms of screening all children for ASD using tools such as the M-CHAT-R/F.[21] The results suggest that PAs' current understanding of the DSM-5 criteria for diagnosing ASD and administering the M-CHAT-R/F are quite low, but that PAs desire to improve their skills in these two areas. This skills gap is important to recognize and address since early intervention may provide the best chance of optimal functioning in children with ASD. According to Robins et al.,[8] even a child who fails the M-CHAT-R/F but subsequently does not have ASD is still considered to be at high risk for other developmental delays. In light of the current results, lectures, webinars, and continuing medical education activities should be targeted at improving these competencies.

The present research found that PAs want to have a better understanding of the red flags of ASD. While no past studies have addressed gaps between current and desired skills in the identification of red flags for ASD, it is important to investigate whether there has been sufficient education provided in this area. Previous research suggests education on ASD has been lacking.[3] The results of this research are consistent with the past study in that PAs stated they had limited education on

the red flags for ASD. One potential area of future research is an analysis of PA program curricula to determine what type of education is being provided on ASD and if it is adequate.

The current research is one of the first large scale studies to investigate PA knowledge, current skills, and desired skills regarding the identification and recognition of ASD. The study also sought to determine if there was a communication gap between PAs and their patients with regard to behavioral health conditions. While the research suggests current skills in identification in ASD to be low, the desire to improve knowledge was higher, suggesting that with additional resources PAs can become proficient in the early identification of ASD and provide guidance to family on early intervention strategies.

Conversations between healthcare providers and patient caregivers about behavioral health conditions can be difficult for many providers to have. For ASD, it is difficult to discuss the treatment and outcomes for their patients when the variability between each child diagnosed with ASD is so broad. Currently, many PA organizations have made a commitment to improving the recognition and communication in patient with behavioral health disorders. Recognizing that PA and caregiver communication surrounding these disorders is challenging, more effort should be made at the educational and organizational levels to improve these skills.

Limitations

This study has several limitations. Although the survey included a large number of PAs, the self-report nature of survey data introduced the potential for nonresponse bias, which may limit generalizability. However, the study sample did mirror that of the general PA population,[22] providing evidence of a representative sample. In addition, the current study did not address the accuracy of the respondents' self-report (i.e., the authors did not assess whether respondents were accurate in their assessment of echolalia, but simply whether they had been trained to assess it, as well as their perceived current skills at identifying it). Despite these shortcomings that are inherent to survey research, the current study is the first of its kind to shed light on PAs' ability to serve on the front lines of ASD identification, screening and referrals for early intervention. Finally, there are clearly additional areas for future research that are not addressed within the current study, such as barriers to discussing ASD and developmental disorders with caregivers, understanding the accuracy of self-report, and whether receiving formal training is superior to on the job training.

Conclusions

In addition to increasing the education on the importance of the conversations as well as how to have the

TABLE 3. Percent of PAs Who Talk to Caregivers, by Condition*

	Yes, with all	Yes, with those for whom there is a concern	No
Depression	14.2	65.8	20.0
Anxiety disorders	9.0	70.3	20.6
Attention deficit/hyperactivity disorder	3.6	63.3	33.0
Autism spectrum disorder	3.6	56.0	40.4
Conduct disorder or operational defiant disorder	3.3	54.0	42.7

*Respondents were PAs who see pediatric patients.

conversations with patients, there is a desire among PAs to increase their skills in early detection and referral of toddlers and children presenting with developmental delays. PAs value working as part of an interprofessional team and early identification along with treatment of ASD requires a multidisciplinary focus. PAs should continue to learn with and from their interprofessional partners to increase their own skills in identifying, diagnosing and managing individuals with ASD which in turn provides the best outcomes for their patients. Additionally, PAs work in pediatrics and many change specialties over time. They often encounter pediatric patients in settings such as emergency medicine, urgent care, family medicine, and even surgery. Due to the high prevalence of ASD, it is incumbent that PAs be able to recognize red flags for ASD, administer the M-CHAT-R/F when appropriate, and know when to refer patients to specialists for further evaluation.

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